BIOLOGICAL SCIENCES BS

More Information

Advising Requirement

Advising is mandatory for this program. Consult your department advisor or program coordinator for information.

E-advising Tools

Students are encouraged to use the interactive e-advising tools that have been designed to help them graduate within four years. These tools can be accessed through the Student Center.

Students who pursue the Bachelor of Science in Biological Sciences choose one of three options. The option in cellular and molecular biology prepares students for professional programs, graduate studies in cellular and molecular biology, or entry-level positions in the biotechnology industry. The option in ecological, evolutionary, and organismal biology prepares students for positions within environmental and resource management or graduate studies in ecology and evolutionary biology. The option in plant biology prepares students for positions in habitat restoration, field botany, forestry or range management, agricultural biotechnology, or graduate studies in plant biology.

Student Learning Outcomes

All candidates for the BS in biological sciences will demonstrate mastery in the following Student Learning Outcomes:

- Students can describe the structure and function of cellular components and explain how they interact in a living cell.
- Students can demonstrate an understanding of the mechanisms driving evolution and can describe similarities and differences of the major taxonomic groups.
- Students can describe how cells interact to develop tissues and organs and how these contribute to a functional organism.
- Students can describe how organisms interact with one another and to their environment and are able to explain interactions at the population and community levels.
- Students demonstrate an understanding of, and ability to use, the processes and methods of scientific inquiry.
- Students can formally communicate the results of biological investigations using both oral and written communication skills.

Grading Requirement

All courses taken to fulfill program course requirements must be taken for a letter grade except those courses specified by the department as credit/no credit grading only.

Course Requirements for the Major: 78 units

Completion of the following courses, or their approved transfer equivalents, is required of all candidates for this degree. Courses in this program may complete more than one graduation requirement.

Course	Title	Units
Lower Division		
BIOL 109	The Biological University Experience (Lower Division)	1
BIOL 161	Principles of Ecological, Evolutionary, and Organismal Biology	4
BIOL 162	Principles of Cellular and Molecular Biology	4
BIOL 163	Principles of Physiology and Development	4
CHEM 111	General Chemistry I	4
CHEM 112	General Chemistry II	4
ENVL 105W	Environmental Literacy (W)	3
or ENVL 105	Environmental Literacy	
PHYS 202A	General Physics I	4
PHYS 202B	General Physics II	4
Select four units from the following: [1]		4
MATH 105 & MATH 130	Introduction to Statistics and Introduction to R	
MATH 109	Survey of Calculus (may be substituted for the above two courses)	
MATH 120	Analytic Geometry and Calculus (may be substituted for the above two courses)	
Upper Division [2]		
BIOL 350W	Fundamentals of Ecology (W)	3
BIOL 360	Genetics	4
BIOL 492	Seminars in Biological Science	1
MATH 315	Applied Statistical Methods I	3
Select one of the following options:		31
Cellular and Molecular Biology (p. 1)		
Ecological, Evolutionary, and Organismal Biology (p. 2)		
Plant Biology (p. 2)		
Total Units		**78**

[1] MATH 105 and MATH 130 are recommended for most students. Students who need calculus may take MATH 109 or MATH 120.

[2] Biological sciences majors are expected to have completed BIOL 109, BIOL 161, BIOL 162, BIOL 163, CHEM 111, and CHEM 112 before beginning their upper-division requirements.

Major Option Course Requirements

Students must select one of the following options for completion of the major course requirements.

The Option in Cellular and Molecular Biology: 31 units

Course	Title	Units
BIOL 409	Molecular Biology	4
BIOL 411	Cell Biology	4
CHEM 270	Organic Chemistry I	4
CHEM 370	Organic Chemistry II	3
CHEM 451	Biochemistry I	3
CHEM 453L	Biochemistry Laboratory	1
Select 12 units from the following:		12
BIOL 371W	Microbiology (W)	
BIOL 389	Clin Laboratory Observation	
BIOL 399	Special Problems [1]	
Any 400-level Biological Sciences (BIOL) course or 600-level BIOL course [1, 2]		
Total Units		**31**

[1] A maximum of three units of BIOL 399 or BIOL 489 or combination of BIOL 399 and BIOL 489 may be credited toward the major.
[2] Undergraduate students need permission to enroll in 600-level courses. Please see the Department of Biological Sciences to obtain permission.

The Option in Ecological, Evolutionary, and Organismal Biology: 31 units

Course	Title	Units
Foundation		
BIOL 408	Principles of Evolution	3
Select one of the following:		4
CHEM 108	Organic Chemistry for Applied Sciences	
CHEM 270	Organic Chemistry I	
Select one of the following:		3
BIOL 369	Advanced Plant Biology	
BIOL 370	Advanced Zoology	
Select 17 units from the following groups, for 31 units total for this option:		17
Select one of the following:		
BIOL 436	Waterfowl Biology	
BIOL 484W	Field Ecology (W)	
Select one of the following:		
BIOL 402	Microbial Ecology	
BIOL 404	Aquatic Ecology	
BIOL 428	Animal Behavior	
BIOL 613	Population Ecology [1]	
BIOL 668	Community and Ecosystem Ecology [1]	
BIOL 672	Plant Ecology [1]	
ERTH 536	Applied Ecology	
Select a minimum of three from the following:		
BIOL 369	Advanced Plant Biology	
BIOL 370	Advanced Zoology	
BIOL 399	Special Problems [2]	
BIOL 422	General Entomology	
BIOL 430	Comparative Anatomy of the Vertebrates	
BIOL 432	Biology of Fishes	
BIOL 433	Herpetology	
BIOL 434	Ornithology	
BIOL 435	Mammalogy	
BIOL 442	Plant Morphology	
BIOL 446	Plant Pathology	
BIOL 448	Plant Diversity and Identification	
BIOL 451	Plant Geography	
BIOL 489	Internship in Biology [2]	
BIOL 490	Peer Mentoring in the Biological Sciences	
BIOL 499H	Honors Research in Biological Sciences	
Select four units from the following:		4
Any 400-level Biological Sciences (BIOL) courses		
Total Units		**31**

[1] Undergraduate students need permission to enroll in 600-level courses. Please see the Department of Biological Sciences to obtain permission.
[2] A maximum of three units of BIOL 399 or BIOL 489 or combination of BIOL 399 and BIOL 489 may be credited toward the major.

The Option in Plant Biology: 31 units

Course	Title	Units
Foundation		
BIOL 369	Advanced Plant Biology	3
BIOL 408	Principles of Evolution	3
BIOL 414	Plant Physiology	4
Select one of the following:		4
CHEM 108	Organic Chemistry for Applied Sciences	
CHEM 270	Organic Chemistry I	
Select one of the following:		3-4
BIOL 448	Plant Diversity and Identification	
BIOL 451	Plant Geography	
BIOL 484W	Field Ecology (W)	
Select 13-14 units from the following groups, for 31 units total for this option:		13-14
Select a minimum of one of the following:		
BIOL 409	Molecular Biology	
BIOL 446	Plant Pathology	
CHEM 451	Biochemistry I	
CHEM 453L	Biochemistry Laboratory	
Select a minimum of one of the following:		
BIOL 370	Advanced Zoology	
BIOL 371W	Microbiology (W)	
BIOL 399	Special Problems [1]	
BIOL 422	General Entomology	
BIOL 442	Plant Morphology	
BIOL 448	Plant Diversity and Identification	
BIOL 451	Plant Geography	
BIOL 484W	Field Ecology (W)	
BIOL 489	Internship in Biology [1]	
BIOL 490	Peer Mentoring in the Biological Sciences	
BIOL 499H	Honors Research in Biological Sciences	
Total Units		**30-32**

[1] A maximum of three units of BIOL 399 or BIOL 489 or combination of BIOL 399 and BIOL 489 may be credited toward the major.

Electives Requirement

To complete the total units required for the bachelor's degree, select additional elective courses from the total University offerings. You should consult with an advisor regarding the selection of courses which will provide breadth to your University experience and possibly apply to a supportive second major or minor.

Honors in the Major

Honors in the Major is a program of independent work in your major. It requires six units of honors coursework completed over two semesters.

The Honors in the Major program allows you to work closely with a faculty mentor in your area of interest on an original performance or

research project. This year-long collaboration allows you to work in your field at a professional level and culminates in a public presentation of your work. Students sometimes take their projects beyond the University for submission in professional journals, presentation at conferences, or academic competition. Such experience is valuable for graduate school and professional life. Your honors work will be recognized at your graduation, on your permanent transcripts, and on your diploma. It is often accompanied by letters of commendation from your mentor in the department or the department chair.

Some common features of Honors in the Major program are:

- You must take six units of Honors in the Major coursework. All six units are honors courses (marked by a suffix of H), and at least three of these units are independent study (399H, 499H, 599H) as specified by your department. You must complete each course with a minimum grade of B.
- You must have completed 9 units of upper-division coursework or 21 overall units in your major before you can be admitted to Honors in the Major. Check the requirements for your major carefully, as there may be specific courses that must be included in these units.
- Yourcumulative#GPA should be at least 3.5 or within the top 5% of majors in your department.
- Your GPAin your major#should be at least 3.5 or within the top 5% of majors in your department.
- Most students apply for or are invited to participate in Honors in the Major during the second semester of their junior year. Then they complete the six units of coursework over the two semesters of their senior year.
- Your honors work culminates with a public presentation of your honors project.

While Honors in the Major is part of the Honors Program, each department administers its own program. Please contact your major department or major advisor to apply.

See Bachelor's Degree Requirements (https://catalog.csuchico.edu/undergraduate-requirements/bachelors-degree-requirements/) for complete details on general degree requirements. A minimum of 39 units, including those required for the major, must be upper division.

General Education Requirements: 48 units

See General Education (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/) and the Class Schedule (http://www.csuchico.edu/schedule/) for the most current information on General Education Requirements and course offerings.

This major has approved GE modification(s). See below for information on how to apply these modification(s).

- BIOL 360 is an approved major course substitution for Upper Division Scientific Inquiry and Quantitative Reasoning (UD-B).

Diversity Course Requirements: 6 units

You must complete a minimum of two courses that focus primarily on cultural diversity. At least one course must be in US Diversity (USD) and at least one in Global Cultures (GC). See Diversity Requirements (https://catalog.csuchico.edu/undergraduate-requirements/diversity-requirements/) for a full list of courses. Most courses taken to satisfy these requirements may also apply to General Education (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/).

Upper-Division Writing Requirement

Writing Across the Curriculum (EM 17-009 (http://www.csuchico.edu/prs/EMs/2017/17-009.shtml/)) is a graduation requirement and may be demonstrated through satisfactory completion of four Writing (W) courses, two of which are designated by the major department. See Mathematics/Quantitative Reasoning and Writing Requirements (https://catalog.csuchico.edu/undergraduate-requirements/mathematicsquantitative-reasoning-writing-requirements/) for more details on the four courses. The first of the major designated Writing (W) courses is listed below.

- Any upper-division Writing (W) course.

The second major-designated Writing course is the Graduation Writing Assessment Requirement (GW) (EO 665 (https://calstate.policystat.com/policy/9585618/latest/)). Students must earn a C- or higher to receive GW credit. The GE Written Communication (A2) (https://catalog.csuchico.edu/colleges-departments/undergraduate-education/general-education/#A2) requirement must be completed before a student is permitted to register for a GW course.